Modular Railing, Fence, Gate, and Security Bars

BACKGROUND OF THE INVENTION

[0001] This invention relates to modular railing, fence, gate, and security bar systems comprised of components that can be arranged and assembled in predetermined patterns without special skills, tools, or devices and where various lengths or heights can be readily accommodated.

[0002] Currently in the art, "ornamental" or "wrought iron" fencing, railing, and security systems constructed of solid components are typically either prefabricated as complete units or custom fabricated at the installation site by skilled craftsmen using welding equipment and other specialized tools. Alternatively, many modular fence, railing, and security systems have been developed which simulate solid ornamental wrought iron, but are constructed of hollow tubing or similar materials, and can require rather complex installation procedures. Thus, the expense and complexity of installation of the most routine fence, gate, railing, or security system with their component parts become very burdensome for the average person - particularly for those who are required by law to build such systems (such as fencing in swimming pools and the like).

[0003] Accordingly, there is a significant need for improvements in ornamental fencing, railing, and security systems.

[0004] One such improvement is a fence, gate, railing, or security system that can be easily installed by an unskilled person utilizing non-specialized tools. Another long sought improvement is the simplification of the components while providing for decorative and ornamental features that can be somewhat customized for each installation. In this regard it is desirable for the system to be made up of relatively few parts, which may be repeated in a particular pattern as well as arranged in different patterns at other installations so that each application appears to have a custom or semi-custom installation. Still further, there has been a desire to provide a modular fence, gate, railing, or security system wherein the component parts may be easily removed and replaced after installation to allow for changing components that have been damaged or to change the ornamental features of the system. It is to these ends that the present invention has been developed.

BRIEF SUMMARY OF THE INVENTION

[0005] The present invention provides modular fence, gate, railing, and security bar systems that can be easily prefabricated, assembled at the installation site, and having a unique ornamental appearance.

[0006] In accordance with one aspect of the present invention (use as a fence and gate), a plurality of fence pickets and fence and gate rail members is provided, each being of a selected dimension and ornamental design which, when assembled, comprise the fence or gate panels. Further, each fence picket is formed to have one or more flattened parts with a hole centered therein and one or more ornamental parts. The fence/gate rails are formed to have a plurality of holes centered on the width of the rail and spaced at predetermined intervals along the length of the fence rail and may have an ornamental design on one or more sides. The fence and gate panels are assembled by attaching the pickets to one rail, or between two or more rails by aligning the holes formed in the rails and pickets, inserting a fastener through the holes, and tightening the fastener appropriately. To complete the assembly of a fence module, a plurality of posts are provided, to which the fence panels are attached. Each of the posts have a predetermined arrangement of tabs; said tabs which are formed with holes or slots to accommodate the attachment of the rail to the post utilizing the fastening method described above. The plurality of posts allows for the arrangement of the fence modules at the installation site. To complete the assembly of a gate module, a gate frame is provided, to which the gate panels are attached. The gate frame has a predetermined arrangement of tabs (tabs as described above); said tabs that accommodate the attachment of the gate rails to the frame utilizing the fastening method described above. The gate module is incorporated into the fence system by attaching the gate frame to a post (usually with two or more hinges) in a predetermined location along the fence-line.

[0007] In accordance with another aspect of the present invention (use as a railing), a plurality of railing balusters, upper hand-rail members, and optional lower rail members are provided, each being of a selected dimension and ornamental design which, when assembled, comprise the railing. Further, each railing baluster is formed to have one or more flattened parts with a hole centered therein and one or more ornamental parts. The upper and lower rail members are formed to have a plurality of holes centered on the width of the rail and spaced at predetermined intervals along the length of the hand-rail and may have an ornamental design on one or more sides. The upper rail member has a cap or handrail, connected perpendicular to the upper rail members. The railing is assembled by attaching the balusters, either to one or between two or more rail members, by aligning the holes formed in the rails and balusters, inserting a fastener through the holes, and tightening the fastener appropriately. To complete the assembly of a railing, the ends of the railing are anchored to a structure using posts or anchors which have a predetermined arrangement of tabs; said tabs which are formed with holes or slots to accommodate the attachment of the rail members to the post or anchor utilizing the fastening method described above.

[0008] In accordance with another aspect of the present invention (use as security bars), a plurality of pickets and rail members is provided, each being of a selected dimension and ornamental design which, when assembled, comprise the security panels. Further, each picket is formed to have one or more flattened parts with a hole centered therein and one or more ornamental parts. The rails are formed to have a plurality of holes centered on the width of the rail and spaced at predetermined intervals along the length of the fence rail and may have an ornamental design on one or more sides. The security bar panels are assembled by attaching the pickets to one rail, or between two or more rails by aligning the holes formed in the rails and pickets, inserting a fastener through the holes, and tightening the fastener appropriately. To complete the assembly of a security bar module, the ends of the railing are anchored to a structure using anchors which have a predetermined arrangement of tabs; said tabs which are formed with holes or slots to accommodate the attachment of the rail members to the anchor utilizing the fastening method described above.

[0009] Some unique features of this system include:

1. [0010] Assembling the plurality of balusters and pickets in different patterns allows for a semi-customized installation.
2. [0011] By utilizing a removable fastener, the replacement of any number of pickets or rails subsequent to the initial installation is possible.
3. [0012] The assembly method allows an un-skilled person to assemble the entire fence module or railing without the use of special tools or equipment.

[0013] Those skilled in the art will further appreciate the above-mentioned features and advantages of the invention together with other superior aspects thereof upon reading the detailed description, which follows in conjunction with the drawings.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING

[0014] Figure 1 is a plan view of the modular fence and gate, showing all of the system components in accordance with the present invention.

[0015] Figure 2 is an exploded view showing the assembly of a fence panel and the attachment of the panel to a post in accordance with the present invention;

[0016] Figure 3 is an exploded view of the assembly of a gate and the attachment of the gate to a post in accordance with the present invention;

[0017] Figure 4 is a perspective view of the corner, in-line, and end posts in accordance with the present invention;

[0018] Figure 5 is a perspective view of typical picket/baluster and several alternate embodiments of said picket/baluster having different ornamental design configurations;

[0019] Figure 6 is a plan view of the modular railing, showing all of the system components in accordance with the present invention configured for use as a balcony rail, with an alternate view of the invention configured for use as a stair rail. The figure includes a cross-section view showing the assembly of the modular railing.

[0020] Figure 7 is a schematic of the bolt (8A) and nut (8B) with diagrams showing the nut before and after the detachable head has been detached.

[0021] Figure 8 is an exploded view of the modular security bar system, showing all of the system components and the method of assembly of said components in accordance with the present invention.

DETAILED DESCRIPTION OF THE INVENTION

[0022] In the description that follows, like parts are marked throughout the specification and figures with the same reference numerals. The figures are not necessarily to scale in the interest of clarity of the inventive features.

[0023] Figure 1 is a plan view that illustrates each component of the present invention (use as fence and gate). The fence panel is an assembly of the fence rails (5), pickets (9) with optional finials (9B), and connecting bolts (8). The assembled panels are attached with connecting bolts (8) to the connecting tabs (7) on various combinations of corner posts, in-line posts (2), or end posts (3), depending upon the desired fence configuration. The gate panel is an assembly of gate rails (6), pickets (9) with optional finials (9B), and connecting bolts (8). The assembled panel is attached with connecting bolts (8) to the connecting tabs (hidden here but shown on Figure 3) on the gate frame (10). The gate frame (10) is attached to an end post (3) with one or more hinges (11).

[0024] Referring to Figure 2, there is illustrated a fence panel assembly in accordance with the present invention. The fence panel is assembled by aligning the holes formed in the upper rail (5F), the holes formed in the flattened portion (9A) of the picket (9), and optionally, with the holes formed in the rear rail (5R), inserting a connecting bolt (8A) through the holes and attaching the nut (8B) to the connecting bolt (8A). The procedure is repeated for any additional rails that may be included in the assembly. The fence panel is attached to a post (in this illustration an end post (3))

by aligning the holes formed in the fence rails (5F and 5R) and the holes formed in the connecting tabs (7) attached to the post, inserting a connecting bolt (8A) through the holes and attaching the nut (8B) to the connecting bolt (8A). The posts are secured in the ground or to structures on the ground.

[0025] In Figure 3 there is illustrated a gate assembly in accordance with the present invention. The gate panel is assembled in the same manner as described for the fence panel in paragraph [0021]. The gate panel is attached to the gate frame (10) by aligning the holes formed in the fence rails (6F, and 6R) and the holes formed in the connecting tabs (7) attached to the gate frame (10), inserting a connecting bolt (8A) through the holes and attaching the nut (8B) to the connecting bolt (8A). The gate frame (10) is attached to an end post (3) with one or more hinges (11).

[0026] Figure 4 is a perspective view of the posts used in the assembly of the fence system. The corner post (1) has connecting tabs (7) attached to two adjacent faces of the post perpendicular to each other. Additional sets of connecting tabs (7) are used for each rail in a fence panel. This arrangement provides for the connection of two fence panels perpendicular to each other. The in-line post (2) has connecting tabs (7) attached to opposite faces of the post arranged in linear alignment with each other. Additional sets of connecting tabs (7) are used for each rail in a fence panel. This arrangement provides for the connection of two fence panels in linear alignment with each other. The end post (3) has a connecting tab (7) attached to a single face of the post. Additional connecting tabs (7) are used for each rail in a fence panel. This arrangement provides for the connection of a fence panel at the end of a fence line or adjacent to a gate. Additional connecting tabs (7) are used for each railing pair in a fence panel.

[0027] Figure 5 is an illustration of alternative embodiments of a picket (9) and a baluster (13). A picket/baluster is an elongated substantially straight rod-like member having opposed distal ends. An ornamental part (9C) or finial (9B) may alternatively be attached to or forged directly upon a picket (9) or a baluster (13) between its distal ends. Those skilled in the art will appreciate that the ornamental part may have different ornamental configurations as shown herein, or characterized by other shapes. In a preferred embodiment of the invention, the picket (9) or baluster (13) has a flattened part (9A or 13A) with a hole centered therein, allowing for the connection of rails to either side, providing additional strength to the connection.

[0028] Figure 6 is a plan view of the modular railing, showing all of the system components in accordance with the present invention configured for use as a balcony rail (Fig. 6A), with an alternate view of the invention configured for use as a stair rail (Fig. 6C). The railing is comprised

of a cap-rail (12), balusters (13), an optional lower rail (14), connecting bolts (8), and mounting anchors (15). The stair rail also includes a newel post (16) with connecting tabs for connecting to the rails. As shown in the section view (Fig. 6B), the cap-rail (12) is manufactured with two parallel rails attached perpendicular to a top rail or, alternatively, a single rail attached perpendicular to a top rail. The railing is assembled by inserting the baluster (13) between the rails (12), aligning the holes formed in the upper rails (12) and the holes formed in the flattened portion (13A) of the baluster (13), inserting a connecting bolt (8A) through the holes and attaching the nut (8B) to the connecting bolt (8A). The optional lower rails are attached to the railing utilizing the same method of attachment. The railing is attached to a structure or the newel post by aligning the holes formed in the rails (12 and 14) and the holes formed in the connecting tabs attached to the mounting anchors (15) and the newel post (16), inserting a connecting bolt (8A) through the holes and attaching the nut (8B) to the connecting bolt (8A). The mounting anchors or newel posts are then secured to the structure.

[0029] Figure 7 is a schematic of the bolt (8A) and nut (8B) with diagrams showing the nut before and after the detachable head has been detached.

[0030] Referring to Figure 8, there is illustrated a security bar assembly in accordance with the present invention. The security bar system is assembled by aligning the holes formed in the upper rail (17), the holes formed in the flattened portion (18A) of the picket (18), and optionally, with the holes formed in the rear rail (17R), inserting a connecting bolt (8A) through the holes and attaching the nut (8B) to the connecting bolt (8A). The procedure is repeated for any additional rails that may be included in the assembly. The security bars are attached to a structure by aligning the holes formed in the rails (17F and 17R) and the holes formed in the mounting anchors (19), inserting a connecting bolt (8A) through the holes and attaching the nut (8B) to the connecting bolt (8A). The mounting anchors are then secured to the structure.

[0031] The modular system components and ornamental parts may be formed of wrought iron or other wrought metals, cast metal, wood, plastic, polyvinyl chloride, or other materials used to construct conventional fencing, railing, or security bar systems.

[0032] The components of this invention may be manufactured with a broad range of dimensions.

[0033] Those skilled in the art will appreciate that the fencing, railing, and security systems may be provided with plurality of pickets/balusters and arranged in a predetermined pattern, as desired, throughout the required length of the system. The modular construction of each of the systems utilizing the separate pickets/balusters with their respective ornamental parts provides for

constructing systems having various ornamental patterns, which systems may be erected at the site of installation. The use of a removable fastener allows for changing or replacing individual pickets/balusters or railings as desired to repair damaged components or alter the design of the system, for example.

[0034] Many building codes and the requirements of other regulatory bodies are such that the spacing between the pickets/balusters of a fence or railing system must be dimensioned in a way that will not allow an object of a certain dimension to pass through the space between the pickets/balusters. In a preferred embodiment of the current invention, the formed holes in the rails are proportioned such that, when erected, the pickets/balusters installed adjacent to each other will provide a barrier to the passage of such an object.

[0035] Those skilled in the art will appreciate from the foregoing description that a fence, gate, railing, and security system has been provided which may be easily prefabricated of a minimum number of parts that may be arranged to provide a functional and aesthetically pleasing fencing, railing, or security system.

[0036] Although preferred embodiments of the invention have been described in detail herein, those skilled in the art will further appreciate that various modifications and substitutions may be made to the rails, pickets/balusters, and other components of the fencing and railing systems provided thereby without departing from the scope and spirit of the invention as recited in the appended claims.

CLAIM OR CLAIMS

[0037] I claim,

(1) A method of connecting components of a modular system by aligning holes formed in one or more rails with similar holes formed in pickets, balusters, and tabs, inserting a connecting bolt through the holes and fastening nuts to the bolts.

(2) A plurality of pickets and balusters formed to have one or more flattened parts with a hole centered therein and optionally, one or more ornamental parts; the flattened part formed to fit between two flat rails to provide more secure attachment to the rails.

(3) Said nuts in Claim 1 having a detachable head that when detached, leaves the remaining portion of the nut and connected bolt looking similar to a rivet.

(4) A modular fence and gate comprising: